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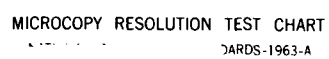
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PETROLEUM MANAGEMENT IN SUPPORT OF COMBAT FORCES

BY

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supply points and distribution means must be flexible, redundant, and highly tailorable. The paper concludes that if planned actions to increase the productivity of the petroleum supply company are accomplished that this unit offers sufficient capability to support in a general and direct support role for both light and heavy combat units. Data was gathered from current petroleum and supply manuals, Department of Army productivity plans, and TRADOC briefings. Major emphasis was given to the author's personal experience operating in petroleum supply units in support of light and heavy units.

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USAWC Military Studies Program Paper

Petroleum Management in Support of Combat Forces

Individual Essay

by

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Abstract

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The paper examines the bulk petroleum distribution system in the CORPS area of operations. Present general support force structure in the CORPS was examined to determine if it would be possible to use its increased productivity to provide both general and direct support to combat formations thereby eliminating the need for the divisional direct support units. The requirement to have highly mobile combat divisions and the ever increasing demand for bulk fuel indicates that petroleum supply points and distribution means must be flexible, redundant, and highly tailorable. The paper concludes that if planned actions to increase the productivity of the petroleum supply company are accomplished that this unit offers sufficient capability to support in a general and direct support role for both light and heavy combat units. Data was gathered from current petroleum and supply manuals, Department of Army productivity plans, and TRADOC briefings.

Major emphasis was given to the author's personal experience operating in petroleum supply units in support of light and heavy units.

The last major effort to study the Army's petroleum distribution system was accomplished in 1977 by the Quartermaster School at Ft. Lee, Virginia. At that time it was found that petroleum distribution doctrine was based upon an obsolete theater command structure, which included a material command, theater army support command, field army support command, and field army. The reorganization of the Army under the Echelons Above Division (EAD) doctrine had eliminated all of the command and control headquarters which processed the forecast requirements and prepared distribution plans for bulk class III.¹

Today the Army has, or is in the process of, a major reorganization of its forces which may have a similar impact on the petroleum system. During the past few years two distinct efforts have been undertaken which impact drastically upon the distribution of bulk petroleum--mechanization of forces on the one hand and the lightening of units on the other. The introduction of modernized combat equipment which consume greater and greater quantities of fuel has had an adverse impact on the division's ability to sustain itself in combat. As these divisions have gained in mobility and combat power, while at the same time attempting to hold down the numbers of personnel and equipment required in their logistical tail, they have outstripped their ability to logistically support themselves.

The large logistical effort required to support these heavy divisions has consequently decreased their rapid deployability and as a result led to the second major effort--the development of the light division. The light division, having little or no logistical tail is dependent on CORPS augmentation (CORPS plugs) in order to conduct sustained combat operations.

The objective of this essay is to examine current Army doctrine, organization, and equipment used for the distribution of petroleum in the CORPS and to recommend changes which will increase productivity and provide a system which will provide effective support to combat formations regardless of their organic petroleum support capabilities. The resupply of petroleum is critical to any operation. It must be timely so as not to impede planned combat operations and be flexible enough to meet the requirements of any type of combat formation put into the field. The petroleum distribution system must be compatible with "heavy" combat units and the new "light" units. As reliance on CORPS level petroleum support continues to grow, and combat units enhance their mobility through increased mechanization on the one hand and reduction of logistical support units on the other, it is necessary to streamline the management of bulk petroleum, especially within the CORPS.

Under present doctrine bulk petroleum enters the CORPS,

usually by pipeline or 5,000 gallon fuel tankers, and is received at terminals operated by petroleum supply companies of the COSCOM petroleum supply battalion at the forward edge of the CORPS boundary. The petroleum supply battalion is the mainstay of the petroleum distribution system within the CORPS. Tailored to meet the requirements of the CORPS, it delivers bulk petroleum to the supply and service companies of the DISCOM's, separate brigades, and to CORPS direct support supply and service companies for issue to consumer units. Petroleum supply companies of the battalion receive, store, and issue bulk fuel at these class III supply points and deliver bulk fuel by hoseline to major consumers. Medium truck companies (petroleum) of the battalion deliver bulk fuel to the mentioned direct support units. Normally such large consumers as the armored cavalry regiment and separate aviation units are supplied by the petroleum supply battalion due to the direct support supplier's limited capability and the large number of retail type customers they have in their areas. The CORPS direct support supply and service company can store, with 100 percent of its collapsible tanks in service, 120,000 gallons of product which must be divided between three products (gasoline, diesel, and jet fuel). It has eight 5,000 gallon bulk fuel tankers with which to make deliveries. A normal petroleum supply battalion, consisting of three petroleum supply com-

panies and three medium truck companies (POL) can store 4.2 million gallons of fuel and has at full strength two hundred four 5,000 gallon bulk fuel tankers with which to make deliveries. Additionally, the battalion would have the capability to install up to thirty miles of assault hoseline to large consumers.

The petroleum supply battalion has traditionally been a storage facility with the mission of storing the CORPS' main source of fuel and moving it forward as direct support units required resupply. This strictly general support role has caused direct support units to take on the full burden of resupplying convoys, medical facilities, engineer units, and other large consumers of fuel in the CORPS area. The high volume requirements of non-divisional units has outdistanced the capabilities of the petroleum platoon of the CORPS supply and service company.

In order to meet the challenge of supplying fuel to the ever growing requirements of non-divisional units it is necessary that the petroleum supply battalion take on the responsibility of the direct support mission. This direct support/general support (DS/GS) role can readily be accomplished with little or no personnel and equipment additions. Several actions can be taken to incorporate this mission. The addition of a multiple outlet gas station type hose and nozzle system is available that is currently being used ex-

tensively by direct support units. By adding this system to the large storage facilities of the petroleum supply company, vehicles moving about the CORPS area can be resupplied and the DS supply and service company's workload can be reduced to a manageable level.

A second action that can be taken that is not new, but not practiced enough, is the resupply of CORPS DS supply and service units by assault hoselines. The four inch assault hoseline available to the petroleum supply company offers an asset that can be rapidly installed, operated by a relatively few troops, and provides large volumes of fuel. The use of this hoseline in resupplying DS units can greatly reduce: medium truck company (POL) requirements, traffic in the DS unit area, and time required to effect resupply. The use of the hoseline to other large consumers can also effectively reduce the demand on DS supplies.

The combat support hospital is a typical example of a unit that requires large volumes of fuel on a daily basis that can be resupplied by a hoseline. During Joint Exercise Bold Eagle 85 this method of resupply was demonstrated. Fuel was pumped on a daily basis a distance of one mile directly into a 10,000 gallon tank at the combat support hospital. This short distance from the supply point required only one pump to push the fuel to the hospital at the rate of 300 to 400 gallons per minute. The use of the hose-

line replaced two 5,000 gallon tanker missions per day. During this exercise only a small portion of the hospital was in use. Fully deployed under combat conditions the savings would have been much greater. The disposition of units during the exercise indicated that four other large consumers within five to ten miles of the supply point could have been effectively resupplied by hoseline rather than 5,000 gallon tankers. An innovative approach to getting the fuel to the hospital's power units involved removing the drain-off valve from the bottom of the 10,000 gallon tank and replacing it with a four inch elbow outlet. This simple modification permitted the feeding of fuel through a four inch hoseline by gravity to the power units. The use of hoses in this manner can be accomplished in a productive manner with aviation units. As with the hospital, it may be necessary for the petroleum unit to establish a suitable storage container at the end of the hoseline if the supported unit is not authorized the equipment.

Under Department of the Army, Office of the Deputy Chief of Staff for Logistics lead, a unit productivity study appears to have well underway plans to increase the capability of the petroleum supply company by increasing the number of supply sections in each platoon from two to three, and by upgrading the size of the collapsible storage tanks from 10,000 gallons to 20,000 gallons. This inno-

vative increase in productivity results in a unit storage increase (from 1.5 to 2.5 million gallons) and an increase in issue capability from 680,000 to 1.2 million gallons per day. The number of personnel required for the total force structure was reduced from 6,048 to 3,636, representing the units in compo 4 and units organized at decremented levels. The requirement for resourced personnel in compo's 1 to 3 was reduced by eight units.² When this change is completed the normal petroleum supply battalion mentioned earlier will have increased its storage capability from 4.2 million to 7.5 million gallons. This same innovative thinking with petroleum truck companies within the petroleum battalion will provide similar benefits. Logical productivity efforts could include the addition of a fourth truck platoon which would reduce Army transportation personnel requirements by approximately a battalion's worth of infantry, and the equipping of all 5,000 gallon tankers with hose and reel kits to provide more flexibility in the use of linehaul tankers in the forward areas to refuel combat vehicles.

Fuel is brought to the division, and when necessary, brigade support area class III supply points by the CORPS petroleum supply battalion. This is usually accomplished by using 5,000 gallon bulk fuel tankers, but can also be accomplished by using assault hoselines, railcars, barges,

and Air Force or Army aircraft. The fuel is either pumped into the storage tanks of the division's supply and service company's fuel system supply point or transferred into division 5,000 gallon fuel tankers for further distribution within the division. The division's supply and service company has the capability to store 120,000 gallons of fuel in its two fuel system supply points and has twenty eight bulk fuel tankers with which to move fuel forward to the brigade trains areas.

There are basic problems or shortcomings in this distribution system. Heavy divisions, that will require approximately 250,000 gallons of fuel per day in heavy combat, do not have the capability to store and move the quantities of fuel demanded. Light divisions, which require relatively little fuel (approximately 15,000 gallons per day), have little or no capability to store its requirements and move it forward. By design the light division will be dependent on its petroleum support, as with other commodities, from a CORPS support unit.

Supply and transport battalion commanders are reluctant to establish supply points supported by their fuel system supply points and rely almost totally on their 5,000 gallon tankers to serve as mobile storage with resupply being provided by general support medium truck companies of the CORPS petroleum supply battalion through tanker to tanker transfers.

In many cases the time used to conduct the fuel transfer between the CORPS and division direct support unit is longer than the travel time from the transfer site to the brigade trains area. Within the division support area it is customary for the general support transportation unit to have to wait for the direct support 5,000 gallon tankers to return from the forward areas before they can transfer their loads. In Europe it is customary for railcars to remain in the forward areas over extended periods until sufficient tankers are available to discharge the cargo. When the fuel is moved forward by the division's fuel tankers to the brigade trains another tanker to tanker transfer is conducted.

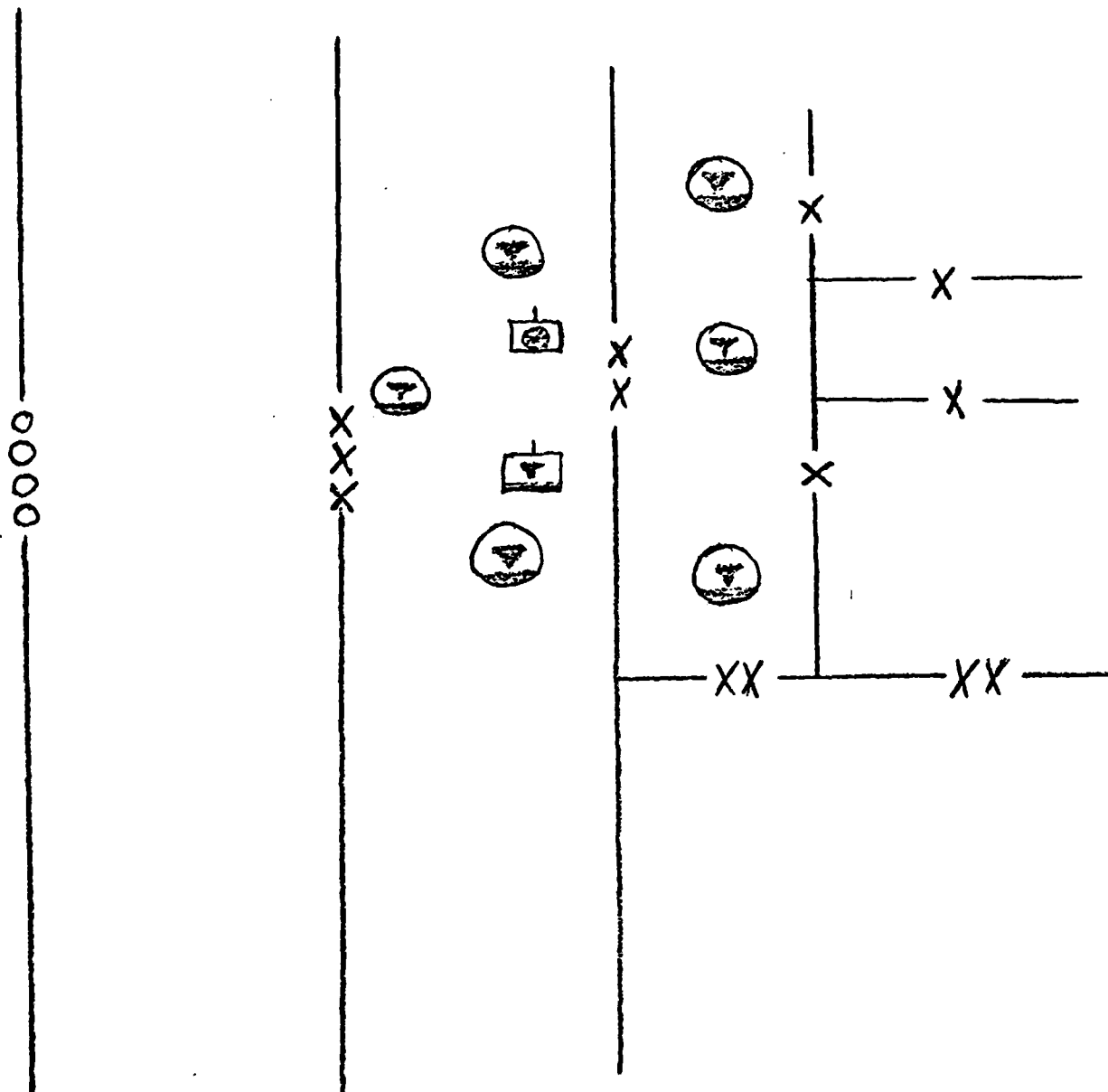
Recent experiences in supporting "light" combat forces has demonstrated that the most preferred method of providing petroleum support has been directly from general support assets. Support for forces in Grenada was provided by a platoon of a petroleum supply company. This platoon, with the storage capacity of four divisional direct support platoons, easily provided direct and general support for the deployed forces. This type platoon also has the capability to establish a five to ten point hot refueling system for helicopters.

Due to the vast increase in productivity in the petroleum supply company it would appear practical to delete the

petroleum force structure in the supply and transport battalion of the divisions and rely upon DS/GS petroleum support from units of the petroleum supply battalion located in the division's rear area. It is apparent that the productivity of the division's petroleum platoon could be increased by using larger ground storage tanks and thus possibly providing the division sufficient capability to store its one day of supply of fuel. This is being done, but the problem of mobility of the supplies remains the critical factor to the division commander. With the limited number of petroleum personnel (one platoon of sixty troops) available to the division, the collapsible tanks can not be rapidly leapfrogged causing increased reliance on the 5,000 gallon tankers for mobile supply points.

The flexibility in the petroleum supply company and the petroleum supply battalion with their greater assets allows for movement of support about the area of operations. This freedom of movement offers the division commander greater options for control of the battlefield and is part of the synchronization effort that must take place on the battlefield.

As depicted in figure 1a the petroleum supply company and transportation truck company (POL) would be located well forward in the CORPS area with approximately half of the company supporting non-divisional units in the CORPS



Positioning of Petroleum Supply Company
in the CORPS and Division areas
Figure 1a

area and half supporting divisional units with supply point and unit distribution. These supply points would support the division in the fashion that direct support ammunition companies do, except that the petroleum supply points are located much farther forward. Located within the division support command area they are able to provide supply point distribution in the manner that today's doctrine calls for from the petroleum platoon of the division. This positioning of the supply platoons offers several advantages. One of the primary advantages is the increased support flexibility it provides. As the division moves forward the supply points in the CORPS area are dried up and moved forward behind the division and the supply points previously dedicated to the division become non-divisional supply points. When the division moves back it falls in on the non-divisional supply points and the division's supply points move to the rear to establish new facilities for the CORPS. The petroleum supply battalion can add additional flexibility by tailoring its companies in even greater depth by shifting assets between companies or splitting platoons for short periods of time to meet the demands for petroleum on the battlefield.

Although the division commander would lose direct control of his so-called wholesale petroleum support assets that were located in the supply and transport battalion he

would be gaining much greater and more responsive petroleum supply support. In reality, since the CORPS commander controls the allocation of available petroleum, the division commander has never really had any control over his petroleum other than that one day of supply he was called upon to store.

A disadvantage to the concept of a division relying on CORPS units for support is that under the present Army peace time organization very little of the general support petroleum supply companies and medium truck companies (POL) are on active duty and available for use. Divisions today are totally dependent on their petroleum platoons for support. In fact, the forward deployed divisions will be dependent upon them to not only perform their normal direct support missions, but also the general support mission until sufficient general support units can be deployed by ship from the United States. Over seventy percent of the petroleum units to be deployed are Reserve Component and will not be immediately available since they are generally undermanned and short equipment.

An alternative to this state of readiness would be to organize and forward deploy portions of DS/GS petroleum supply companies and attach them to the divisions for peacetime support. This alternative would offer several advantages. First, it would establish the foundation for a support

base which presently is non-existent. These reinforced platoons could establish a support relationship with the division and become familiar with roadnets and supply point locations. Presently, deploying reserve petroleum supply and truck units will deploy to Europe, for example, and attempt to provide effective supply support with little or no knowledge of the terrain. There are programs ongoing to get a few reservists over to Europe each year to become familiar with their area of operations, but these efforts cannot replace the knowledge forward stationed troops can provide. Secondly, the deployment of DS/GS platoons would provide the division with greater capabilities than it currently enjoys. A DS/GS platoon would have approximately 3 million gallons of storage capacity compared to the division's current capability of 120,000 gallons. The number of 5,000 gallon tankers assigned to the DS/GS platoon should be at least two platoons or forty tankers. The critical aspect of the support during this transition to war period is the positioning of small supply points indepth throughout the division's area of operations. This can be accomplished within the personnel capabilities of a DS/GS platoon. The use of the platoon in this manner also provides the storage, pumps, and hoselines necessary to offload railcars arriving from the main petroleum tank farms west of the Rhine River.

A side benefit from forward deploying the DS/GS platoons is that it provides a reception capability for the remainder of the company as it arrives. The blending of active duty personnel that have been operating within the division's area and the newly arrived reserve and national guard personnel will enhance support capabilities from the first day of their arrival.

In terms of the light division, the CORPS plug for its petroleum support becomes the petroleum supply company as augmented by assets from the transportation medium truck company (POL). This CORPS plug concept is not new to the Army and as mentioned earlier has been used often to support light and heavy divisions in the field.

To meet the requirements of the light division it is essential that petroleum support be tailored to meet the need. For example, a petroleum supply company task force may consist of a petroleum platoon (or section) and a platoon from a medium truck company (POL). The basic concept is not to waste forces that may be needed to support another division. The augmentation given a light division will impact on the task organizing. If the division is given a medium truck company (CGO), engineer elements, and possibly even some armor then the DS/GS petroleum support would be tailored up.

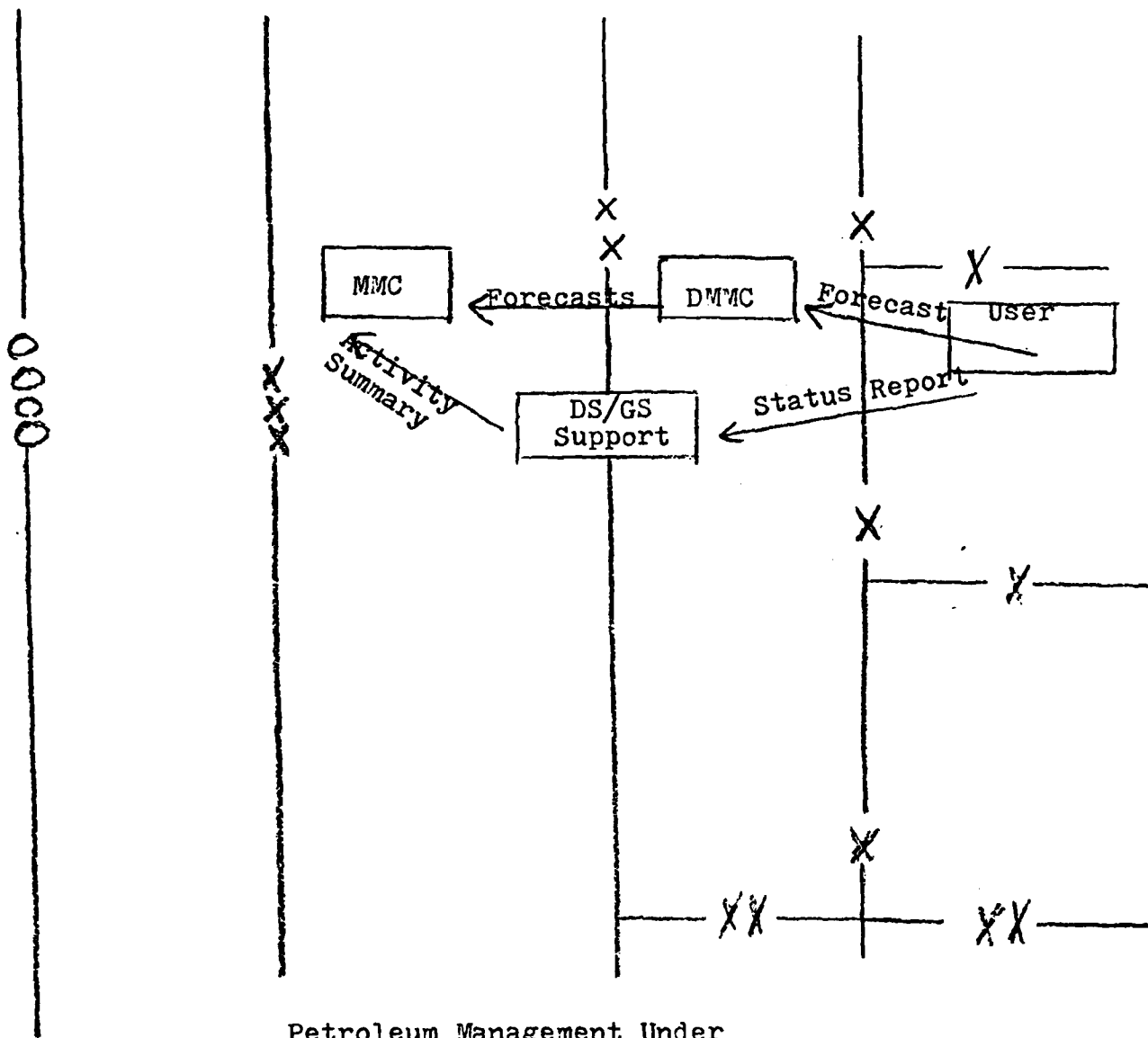
Today units in the division report their petroleum status

and needs through their S-4's to the DMMC. The main class III supply point of the supply and transport battalion sends the DMMC a status report each day on the types and amounts of fuel received, issued, and on hand. With this information the DMMC petroleum officer coordinates with the G-4 and G-3 to determine if assets are sufficient to meet the division's needs. If there are not the DMMC petroleum officer must communicate with the CORPS MMC for additional supplies. The critical aspects of this management system are the need to communicate with the CORPS MMC and the fact that divisional allocations of fuel may be in storage in the petroleum supply company waiting to be moved forward. Under the CORPS DS/GS management system the DMMC petroleum officer would have a desk in the operations center of his supporting petroleum supply company. Not only would the petroleum officer know the status of his division based on reports delivered to him when the using units reported to the supply points, but he would also have an up to date visibility of his division's petroleum assets in the CORPS storage. He would be able, as is the division ammunition officer at the CORPS DS ammunition supply point, to account for units picking up fuel at the supply point. Often it is the case that divisional units by-pass the division's main supply platoon and top off their refuelers from CORPS supply points.

Figure 1b depicts the petroleum management concept under

CORPS DS/GS support. Petroleum fuel requirements originate with the users and are forwarded to the DMMC petroleum officer at the CORPS DS/GS petroleum supply company in the form of status reports and forecasts for long range planning. For the most part however, most long range forecasting is accomplished by the DMMC petroleum officer in coordination with his G-3 and G-4 and do not involve to any great degree the S-4's of the brigades. The DMMC forwards these long range forecasts to the CORPS MMC for planning purposes. These forecasts impact on the formulation of the slate at theater level and play a big role in determining the movement schedule of ships into the theater. In a bare base environment with a CORPS size theater the formulation of the slate would be done by the CORPS. Short range requirements are determined by the DMMC petroleum officer in coordination with the CORPS DS/GS petroleum supply unit to assure the availability of bulk petroleum for immediate needs. Bulk petroleum would be forwarded into the brigade trains areas where unit refuelers would be topped off. As the circumstances might require CORPS transportation assets could be used to establish larger points for the rapid refueling of brigade size combat formations.

The DS/GS petroleum management system, as does the current system, supplies bulk petroleum by immediately replacing quantities issued and consumed. The status reports,



Petroleum Management Under
DS/GS Support
Figure 1b

which substantiate issues of products made during any given period, are the basis of system replenishment. When, and if, controls are imposed, the objective is not to allocate or limit quantities of products, but to provide information to the command for decisions affecting diversions or other adjustments needed to satisfy requirements.

A basic goal of the Army today is to be able to project combat power into any area of the world and be able to sustain it with the minimum logistical effort necessary to get the job done. The development of modern weaponry over the past decade, with its trend toward greater mechanization, heavier armor, and aviation, has generated quantum increases in petroleum consumption. Over the same period, there have been comparatively few innovations in improving the petroleum distribution system to meet the challenge of modernization. The advent of the light division will require a flexible petroleum distribution system which can be tailored to provide the direct support needed well forward in the combat zone.

The concept of providing CORPS plugs to support combat formations is sound. In the case of petroleum support the building blocks for this plug are available in the force structure today. The tailoring of petroleum supply and truck platoons to form companies and battalions is the keystone of the petroleum distribution system whether it be in

support of heavy or light divisions.

The Army can no longer afford to provide divisions, separate brigades, and other similar units with their own ill prepared petroleum logistical support. The centralization of petroleum support within the CORPS at the petroleum supply battalion offers an innovative approach to supply support. By broadening the mission of the petroleum battalion to a direct support/general support role and moving it forward into the division the distribution system can be simplified and made more effective in providing petroleum support.

By locating the DS/GS petroleum supply unit within the divisions area greater mobility of large stores of fuel can be realized. This close association with the division also places the division's petroleum officer in closer contact with his supporting units and communications are greatly facilitated and control of issues of fuel to divisional units becomes more effective. The dispersion of petroleum supply points across the division provides improved supply support and provides redundancy to the petroleum distribution system.

The use of DS/GS petroleum supply units to form the basis for CORPS plugs to support light formations coincides with the proposed system to support heavy formations. The tailorability of the petroleum supply company provides an ideal unit in today's force structure with which to accomplish the mission.

The assignment of new missions and additional responsibilities within the CORPS and division areas to the petroleum supply battalion and its companies will centralize the petroleum distribution system planning and control, but decentralize the distribution at the user level through wider dispersion of supply points and closer association with supported units. The DS/GS concept of petroleum support will resolve the problem of inadequate DS support in the heavy divisions and provide effective supply support to the light divisions coming into the Army force structure.

ENDNOTES

1. Quartermaster School, Bulk Petroleum Fuels Distribution in a Theater of Operations, ACN 22945, p. x.

2. Quartermaster School, Logistics System Program Review, July, 1984, pp. 226-234.

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